

# BS IN BIOCHEMISTRY DEGREE

## *Suggested Course Sequence*

- The BS Biochemistry degree program provides excellent preparation for a career in the biotech industry or post-graduate work. It also offers flexibility in upper division elective options, which enables students to better customize their degree program for their intended career path. Students are urged to consult with an advisor regarding their educational and career plans.
- Students are *required* to meet with a *Chem/Biochem advisor* each fall to discuss their progress towards their degree and their tentative class schedule for the next year.
- Students are *urged* to meet with a *General Education (GE) advisor* (Advising Center, ADM 211) to ensure that their course selections for GE Segments I, II, and III meet graduation requirements.
- Students should refer to the *SFSU Bulletin* for detailed information on *University policies and procedures, GE requirements, requirements for the major, and course descriptions and prerequisites.*

### **Freshman Year - Fall Semester**

CHEM 115	General Chemistry I	5 units
PHYS 111 <sup>1</sup>	General Physics I	3 units
PHYS 112 <sup>1</sup>	General Physics I Lab	1 unit

### **Freshman Year - Spring Semester**

CHEM 333	Organic Chemistry I	3 units
CHEM 334	Organic Chemistry I Lab	2 units
PHYS 121 <sup>1</sup>	General Physics II	3 units
PHYS 122 <sup>1</sup>	General Physics II Lab	1 unit

### **Sophomore Year - Fall Semester**

CHEM 335	Organic Chemistry II	3 units
BIO 230	Intro Biology I	5 units
MATH 226	Calculus I	4 units

### **Sophomore Year - Spring Semester**

CHEM 215	General Chemistry II	3 units
CHEM 216	General Chemistry II Lab	2 units
MATH 227	Calculus II	4 units

### **Junior Year - Fall Semester**

CHEM 340	Biochemistry I	3 units
CHEM 320	Quantitative Analysis	3 units

### **Junior Year - Spring Semester**

CHEM 341	Biochemistry II	3 units
CHEM 343	Biochemistry I Lab	3 units

### **Senior Year - Fall Semester**

CHEM 300 <sup>2</sup>	General Physical Chemistry	3 units
*** <sup>3</sup>	Chemistry or Biology Electives	7 units

### **Senior Year - Spring Semester**

CHEM 301 <sup>2</sup>	General Physical Chemistry II	3 units
*** <sup>3</sup>	Chemistry or Biology Electives	6 units

### **Notes:**

All courses required for the major must be completed with *grades of C or better*

<sup>1</sup> PHYS 220/222 and 240/242 may be substituted for PHYS 111/112 and 121/122

<sup>2</sup> CHEM 351 and 353 may be substituted for CHEM 300 and 301 upon advisement, note these courses only offered fall or spring semesters

<sup>3</sup> **Students must complete a minimum of 13 units selected from the following lists; at least 4 of these 13 units must have a CHEM prefix and at least 4 of these 13 units (CHEM or BIO) must be lab units (see below for lab unit designations).** Be sure to check course co- and pre-requisites before enrolling in these elective classes. Students may substitute grad courses in chemistry or appropriate courses in biology, physics, geosciences, and computer science upon prior approval of their major advisor.

### **Advanced Electives in Chemistry:**

CHEM 336 OR 338	Organic Chemistry II Lab	3 units (2 lab units)
CHEM 370	Computer Applications in Chem & Biochem	3 units (1 lab unit)
CHEM 420	Environmental Analysis	3 units (1 lab unit)
CHEM 422	Instrumental Analysis	4 units (2 lab units)
CHEM 425	Inorganic Chemistry	3 units
CHEM 426	Inorganic Chemistry Lab	2 units (1 lab unit)
CHEM 433	Advanced Organic Chemistry	3 units
CHEM 443	Biophysical Chemistry Lab	4 units (2 lab units)
CHEM 451	Physical Chemistry Lab	2 units (1 lab unit)
CHEM 470	Research (on biochemistry-related topic)	3 units (2 lab units)
CHEM 640	Special Topics in Biochemistry	2-3 units

### **Advanced Electives in Biology:**

BIO 350	Cell Biology	3 units
BIO 351	Expts in Cell Biology & Genetics	4 units (2 lab units)
BIO 355	Genetics	3 units
BIO 357	Molecular Genetics	3 units
BIO 358	Expts in Molecular Biology	4 units (2 lab units)
BIO 361	Human Genetics	3 units
BIO 382	Developmental Biology	3 units
BIO 401	General Microbiology	3 units
BIO 402	General Microbiology Lab	2 units (2 lab units)
BIO 435	Immunology	3 units
BIO 436	Immunology Lab	2 units (2 lab units)
BIO 524	Plant Molecular Biology	3 units
BIO 525	Plant Physiology	3 units
BIO 526	Plant Physiology Lab	2 units (2 lab units)
BIO 612	Human Physiology	3 units
BIO 613	Human Physiology Lab	2 units (2 lab units)
BIO 640	Cellular Neurosciences	3 units

**Suggested electives for Prep for Graduate Program in Biochemistry:** CHEM 336, BIO 350, BIO 355, CHEM 422 or CHEM 443, CHEM 470

**Suggested electives for Pre-Health Students:** CHEM 336, BIO 355, and 2 of following: BIO 350, BIO 361, BIO 435, BIO 612, BIO 613, BIO 640

**Suggested electives for Career in Medicinal/Pharmaceutical Chemistry:** CHEM 336, BIO 350, BIO 612, CHEM 640 (Med Chem), BIO 730 (Pharmacology)

**Suggested electives for Career in Bioinorganic Chemistry:** CHEM 443, CHEM 425, CHEM 426, CHEM 844

**Suggested electives for Career in Bioanalytical Biotechnology:** CHEM 336, CHEM 422, CHEM 443

**Suggested electives for Career in Environmental Biochemistry:** CHEM 336, CHEM 420, CHEM 422

**Students in Cell & Molecular Biology wishing to Double-Major in Biochemistry:** Take the following additional courses CHEM 334, CHEM 320, CHEM 300, CHEM 301, and one additional 4-unit CHEM course; take MATH 227 as 2<sup>nd</sup> math course; and take CHEM 343 as a Group B elective. This adds 17 units to the C&MB degree.

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## Flowchart and Tracking Sheet

- The tracking sheet is intended to illustrate *prerequisite and corequisites* for upper-division courses.
- Solid arrows indicate *prerequisite courses* (courses that must be completed *before* the course pointed to).
- Dashed arrows indicate *corequisite courses* (courses that must be completed *before or at the same time* as the course pointed to).
- Students should consult the course listings in the SFSU Bulletin to determine *entrance exam requirements* (if applicable) and the *minimum grade required for prerequisite courses*.
- Students may use the space provided next to each course to denote the grade they received, which will facilitate tracking their progress towards graduation.

